

REMARKS

With entry of the amendment, claims 1, 5, 6, 13, 14, 16-22, 43, 50, and 52-63 are pending in the application. Claims 2-4, 71-12, 15, 23-42, 44-49, 51 and 58-60 are canceled. Claims 1, 5, 13, 14, 16-21, 43, 50 and 52-55 are amended for clarity, and claims 64 and 65 are new. The claims are supported by the originally filed application.

The specification is amended to include the language of original claims 18 and 38.

Applicants respectfully submit that the amendments do not add new matter.

Examiner Interview

An interview was held between the Examiner and the undersigned on August 30, 2010 to discuss the rejections of record. Various issues of clarity regarding the claim language were discussed. To expedite prosecution, Applicants representative proposed several of the amendments contained in this response. Applicants thank the Examiner for her time and attention to this application.

Claim Objections

Claims 1, 5, 18, 20 21, 43, 50 and 55 were objected to for minor informalities.

Claims 5, 18, 20 and 21 have each been amended to add “the” before lactose, as the Examiner suggested.

Claims 1, 43, 50 and 55 have each been amended to indent each step of the claim, as the Examiner suggested.

Rejections Under 35 U.S.C. § 112, first paragraph

Claims 18, 52 and 58 were rejected under 35 U.S.C. § 112 as containing new matter with respect to the recitation of “more than 1%” or “1% or more.” Applicants have amended the specification to recite that a “method for reproducing conifers by somatic embryogenesis is disclosed wherein a galactose-containing compound at more than about 1% of the nutrient medium is used as a carbon source for an embryogenic culture during at least one of the steps of induction, proliferation, and prematuration.” Support for the amendment is found at least in original claim 18.

Applicants further amended the specification to recite a “method for reproduction by somatic embryogenesis of *Pinus taeda* and hybrids, *Pinus radiata*, or *Pseudotsuga menziesii* is disclosed wherein a galactose-containing compound at more than about 1% of the nutrient

medium is used during at least one of the steps of induction, proliferation, and prematuration.” Support for the amendment is found at least in original claim 38.

Applicants respectfully submit that claims 18, 52 and 58 are supported by the originally filed application and the description at least as amended above, and at page 7, lines 5-10, and page 14, Example 5.1.

Rejections Under 35 U.S.C. § 112, second paragraph

Claims 1, 5, 6, 13, 14, 16-22, 43, 50 and 52-63 were rejected under 35 U.S.C. § 112 for allegedly failing to particularly point out the subject matter.

Independent Claim 1

Claim 1 was rejected for being indefinite with respect to recitation of “the nutrient medium” and “maturation medium”. Applicants have amended claim 1 for clarity. Applicants respectfully submit that the amendments to claim 1 render the rejection moot.

Claims 5 and 6

Claim 5 was rejected for not specifying whether the percentage was by weight or volume. While one of skill in the art would understand that the percentages are recited by weight, to expedite prosecution, Applicants have amended claim 5 accordingly.

Claims 5 and 6 were also rejected for allegedly lacking clarity regarding recitation of “the nutrient medium”. Applicants respectfully submit that the amendments to claim 1 render the rejection of claims 5 and 6 moot. Claim 5 specifies that lactose is less than 6 wt. % the nutrient medium (which encompasses one of induction, maintenance or prematuration medium) and thus further limits claim 1. For claim 6, nutrient medium could encompass such forms as gel, liquid or impregnated pads. Claim 6 further limits claim 1 by specifying that the nutrient medium is gelled or liquid.

Claims 13 and 14

Claims 13 and 14 were rejected for being unclear with respect to reciting “the prematuration medium”, and the amounts of auxin and cytokinin. The amendments to claims 13 and 14 render the rejections moot.

Claims 16 and 17

Claims 16 and 17 were rejected for lacking antecedent basis for “the additional sugars.” Claims 16 and 17 are amended to address the rejection.

Claim 18

Claim 18 was rejected for not specifying whether the percentage was by weight or volume. While one of skill in the art would understand that the percentages are recited by weight, to expedite prosecution, Applicants have amended claim 18 accordingly.

Claim 18 was also rejected for allegedly being indefinite for reciting “more than 1.0%”. Applicants respectfully submit that claim 18 is not indefinite. As the Examiner has noted, Applicants disclose a range of suitable concentrations of lactose, including, for example, less than about 6%, and 6%. These values do not make the metes and bounds of claim 18 unclear, as the Examiner alleges, because they do conflict with the recitation of “more than 1%.” Rather, they encompass values such as 2%, 3%, 4% and 5% which are consistent with a recitation of “more than 1%.” Furthermore, while in certain embodiments lactose may be “6%” or “less than 6%,” this does not preclude more lactose being suitably used in other embodiments. In addition, the amendments to the specification discussed above make clear that “more than 1.0%” was envisaged by the inventors at the time the application was filed.

Claim 18 was also rejected for allegedly lacking clarity regarding recitation of “the nutrient medium”. Applicants respectfully submit that the amendments to claim 1 render the rejection of claim 18 moot.

Claim 19

Claim 19 was rejected for lacking antecedent basis for “the embryonic culture” and for failing to further limit claim 1. To expedite prosecution, Applicants have amended claim 19 to recite “the immature embryonic culture.” Applicants respectfully submit that one of skill in the art would appreciate that immature embryonic cultures encompass at least both early-stage and mid-stage embryos. Accordingly, Applicants submit that claim 19 does further limit claim 1.

Claims 20 and 21

Claims 20 and 21 were rejected for not specifying whether the percentage was by weight or volume. While one of skill in the art would understand that the percentages are recited by weight, to expedite prosecution, Applicants have amended claims 20 and 21 accordingly.

Claims 20 and 21 were also rejected for allegedly lacking clarity regarding recitation of “the nutrient medium”. Applicants respectfully submit that the amendments to claim 1 render the rejection of claims 20 and 21 moot.

Claim 22

Claim 22 was rejected for allegedly lacking clarity regarding recitation of “the nutrient medium”. Applicants respectfully submit that the amendments to claim 1 render the rejection of claim 22 moot.

Independent Claim 43

Claim 43 was rejected for lacking antecedent basis for “the embryonic culture” and for failing to further limit claim 1. To expedite prosecution, Applicants have amended claim 43 to recite “the immature embryonic culture.”

Independent Claim 50

Claim 50 was rejected for being indefinite with respect to recitation of “the nutrient medium” and “maturation medium”. Applicants have amended claim 50 for clarity. Applicants respectfully submit that the amendments to claim 50 render the rejection moot.

Claim 52

Claim 52 was rejected for not specifying whether the percentage was by weight or volume. While one of skill in the art would understand that the percentages are recited by weight, to expedite prosecution, Applicants have amended claim 52 accordingly.

Claim 52 was also rejected for allegedly being indefinite for reciting “1.0% or more”. Applicants respectfully submit that claim 52 is not indefinite. As the Examiner has noted, Applicants disclose a range of suitable concentrations of lactose, including, for example, 1%, 1.5%, less than about 6%, and 6%. The Examiner states that “there is no mention of lactose concentration containing 6% or more.” Office action, page 11, lines 12-13. However, while in certain embodiments lactose may be “6%” or “less than 6%,” this does not preclude more lactose being suitably used in other embodiments. In addition, the amendments to the specification discussed above make clear that “more than 1.0%” was envisaged by the inventors at the time the application was filed.

Claim 52 was also rejected for allegedly lacking clarity regarding recitation of “the nutrient medium”. Applicants respectfully submit that the amendments to claim 50 render the rejection of claim 52 moot.

Claims 53 and 54

Claims 53 and 54 were rejected for not specifying whether the percentage was by weight or volume. While one of skill in the art would understand that the percentages are recited by weight, to expedite prosecution, Applicants have amended claims 53 and 54 accordingly.

Claims 53 and 54 were also rejected for allegedly lacking clarity regarding recitation of “the nutrient medium”. Applicants respectfully submit that the amendments to claim 50 render the rejection of claims 53 and 54 moot.

Independent Claim 55

Claim 55 was rejected for being indefinite with respect to recitation of “the nutrient medium” and “maturation medium”. Applicants have amended claim 55 for clarity. Applicants respectfully submit that the amendments to claim 55 render the rejection moot.

Claim 58

Claim 58 was rejected for not specifying whether the percentage was by weight or volume. While one of skill in the art would understand that the percentages are recited by weight, to expedite prosecution, Applicants have amended claim 58 accordingly.

Claim 58 was also rejected for allegedly being indefinite for reciting "1.0% or more". Applicants respectfully submit that claim 58 is not indefinite. As the Examiner has noted, Applicants disclose a range of suitable concentrations of lactose, including, for example, 1%, 1.5%, less than about 6%, and 6%. The Examiner states that "there is no mention of galactose-containing sugar concentration containing more than 6%." Office action, page 14, lines 5-6. However, while in certain embodiments lactose may be "6%" or "less than 6%," this does not preclude more lactose being suitably used in other embodiments. In addition, the amendments to the specification discussed above make clear that "more than 1.0%" was envisaged by the inventors at the time the application was filed.

Claim 58 was also rejected for allegedly lacking clarity regarding recitation of "the nutrient medium". Applicants respectfully submit that the amendments to claim 55 render the rejection of claim 58 moot.

Claims 59 and 60

Claims 59 and 60 were rejected for not specifying whether the percentage was by weight or volume. While one of skill in the art would understand that the percentages are recited by weight, to expedite prosecution, Applicants have amended claims 59 and 60 accordingly.

Claims 59 and 60 were also rejected for allegedly lacking clarity regarding recitation of "the nutrient medium". Applicants respectfully submit that the amendments to claim 55 render the rejection of claims 59 and 60 moot.

Rejections Under 35 U.S.C. § 102(b)

Claims 1, 6, 13-14, 17, 19, 22, 50, 55 and 56 stand rejected Under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 5,491,090 issued to Handley et al. ("Handley")

Claims 1, 6, 16-17, 19, 22, 50 and 55-63 stand rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 6,492,174 issued to Pullman et al. ("Pullman").

Independent Claim 1

Claim 1 recites a method for growing an immature embryogenic culture on a nutrient medium which comprises lactose and an additional sugar and is selected from the group consisting of induction medium, maintenance medium and prematuration medium.

Handley does not anticipate claim 1, because it fails to teach or suggest use of lactose and an additional sugar in an induction, maintenance or prematuration medium in a method for growing an immature embryogenic culture according to claim 1. Handley mentions several sugars as useful in the culture of somatic embryos, but does not mention lactose at all. Accordingly, Handley does not anticipate claim 1.

Pullman does not anticipate claim 1, because it fails to teach or suggest use of lactose and an additional sugar in an induction, maintenance or prematuration medium in a method for growing an immature embryogenic culture according to claim 1. Pullman mentions several sugars as useful in the culture of somatic embryos, but does not mention lactose at all. Accordingly, Pullman does not anticipate claim 1.

Claims 6, 13, 14, 16, 17, 19, and 20

Claims 6, 13-14, 16, 17, 19 and 22 each depend from allowable claim 1, and accordingly are allowable for at least the reasons set forth above. Claims 6, 13-14, 17, 19 and 22 may be additionally patentable for reasons not discussed herein.

Independent Claim 50

Claim 50 recites a method for growing an immature embryogenic culture of *Pinus taeda* somatic embryos or hybrids thereof on a nutrient medium comprising lactose, selected from induction medium, maintenance medium and prematuration medium.

Handley does not anticipate claim 50, because it fails to teach or suggest use of lactose in an induction, maintenance or prematuration medium in a method for growing an immature embryogenic culture according to claim 50. Handley mentions several sugars as useful in the culture of somatic embryos, but does not mention lactose at all. Accordingly, Handley does not anticipate claim 50.

Pullman does not anticipate claim 50, because it fails to teach or suggest use of lactose in an induction, maintenance or prematuration medium in a method for growing an immature embryogenic culture according to claim 50. Pullman mentions several sugars as useful in the culture of somatic embryos, but does not mention lactose at all. Accordingly, Pullman does not anticipate claim 50.

Independent Claim 55

Claim 55 recites a method for growing an immature embryogenic culture on a nutrient medium which comprises maintenance medium or prematuration medium and includes a galactose-containing sugar and an additional sugar, and which includes the step of growing and maintaining the embryogenic culture, or the step of transferring the embryogenic culture from

the prematuration medium to a maturation medium not containing auxin or cytokinin for subsequent development of mature embryos capable of germination.

Handley does not anticipate claim 55, because it fails to teach or suggest use of a galactose-containing sugar and an additional sugar in an induction, maintenance or prematuration medium in a method for growing an immature embryogenic culture according to claim 55. Handley mentions several sugars as useful in the culture of somatic embryos, but does not mention galactose-containing sugars at all. Accordingly, Handley does not anticipate claim 55.

Pullman does not anticipate claim 55, because it fails to teach or suggest media for use in maintenance or prematuration and is limited to media for improving initiation (induction). Pullman does not teach or suggest maintaining an embryonic culture, or transferring the embryogenic culture from prematuration medium to a maturation medium not containing auxin or cytokinin for subsequent development of mature embryos capable of germination according to claim 55. Accordingly, Pullman does not anticipate claim 55.

Claims 56-63

Claims 56-63 each depend from allowable claim 1, and accordingly are allowable for at least the reasons set forth above. Claims 53-63 may be additionally patentable for reasons not discussed herein.

Rejections Under 35 U.S.C. § 103(a)

Claims 1, 6, 13-14, 16, 17, 19, 22, 50 and 55-63 are rejected to under 35 U.S.C. §103(a) as being obvious over Pullman in view of Handley in light of U.S. Patent No. 6,897,065 issued to Find.

Claims 1, 5-6, 16-19, 20-21, 50, 52-63 are rejected to under 35 U.S.C. §103(a) as being obvious over Pullman in view of Schuller et al. (1993) Plant Cell Reports, Vol. 12, pp. 199-202 ("Schuller").

Independent Claim 1

Claim 1 recites a method for growing an immature embryogenic culture on a nutrient medium which comprises lactose and an additional sugar and is selected from the group consisting of induction medium, maintenance medium and prematuration medium.

Pullman, Handley and Find

The deficiencies of Pullman and Handley with respect to claim 1 have been argued above, in the prior appeal brief, and in prior responses. These arguments are incorporated herein by reference, *mutatis mutandis*. Neither Pullman nor Handley teach or suggest the use

of lactose and an additional sugar in an induction, maintenance or prematuration medium in a method for growing an immature embryogenic culture according to claim 1.

The Examiner combines Pullman and Handley with Find, but the Office action fails to indicate how Find cures the deficiencies of Pullman and Handley set forth above. Find teaches use of lactose in the maturation step of conifer somatic embryogenesis, not in induction, maintenance or prematuration of immature embryonic cultures. As detailed in the declarations of Attree and Fowke (submitted with the Response filed May 16, 2008), those skilled in the art would expect the media used during different phases of growth to be different. See Fowke Declaration at 9 and Attree Declaration at 8. During induction, maintenance and prematuration the somatic embryos need to be induced, grow and be maintained in an immature state. Maturation requires the somatic embryos to stop proliferating and to differentiate into mature embryos. Thus, Find's teaching of the use of lactose in maturation media would not combine with Pullman and Handley to teach the elements of the claim because Pullman and Handley do not teach use of lactose in induction, maintenance or prematuration media, and those skilled in the art understand the very different media requirements for the maturation step as opposed to the induction, maintenance and prematuration steps of somatic embryogenesis.

Pullman and Schuller

The deficiencies of Pullman with respect to claim 1 have been argued above, in the prior appeal brief, and in prior responses. These arguments are incorporated herein by reference, *mutatis mutandis*.

The Examiner combines Pullman with Schuller, but has failed to establish a prima facie case of obviousness for at least two reasons. First, in contrast to claim 1, in which the coniferous somatic embryos are *Pinus taeda* somatic embryos or hybrids thereof, Schuller teaches a nutrient medium for use in *Abies alba*. As noted in the specification at page 7, lines 12-15, *Abies alba* has distinct growth requirements from other conifers. Schuller also notes that *Abies* somatic embryogenesis is distinct from that of other conifers including *Pinus*. See Schuller at page 23, Introduction ("[s]omatic embryogenesis in *Abies alba*... is different from that in other conifers since the induction and proliferation of ESM could be achieved on media supplemented with cytokinin only. With sucrose, a carbohydrate source which is widely used for propagation of other conifers, no maturation of SE was observed in *Abies alba*."). Thus, one skilled in the art would not look to *Abies alba* somatic embryogenesis for direction on *Pinus taeda* somatic embryogenesis.

Second, Schuller teaches the use of lactose in prematuration media during *Abies alba* somatic embryogenesis. As shown in Table 5 of Schuller, use of lactose produced no late stage

cotyledonary embryos capable of germination. Schuller also indicates that use of lactose in the prematuration media produced browned embryos, but did allow for differentiation. See page 28, column 1. The discussion section of Schuller also indicates that lactose is acting to promote differentiation by causing a transient nutrient deficiency. See page 29, column 2. As indicated in the declarations of Attree and Fowke submitted on May 16, 2008, induction, maintenance and prematuration are all phases of somatic embryogenesis in which differentiation of the cells is not desired. Thus, one of skill in the art with Schuller in hand would not have chosen to use lactose in a media for proliferation of somatic embryos as recited in claim 1.

Accordingly, the Office action fails to establish a *prima facie* case of obviousness for claim 1.

Claims 5, 6, 13,14,16-19, 20-21

Claims 5-6, 13,14,16-19, 20-21 each depend from allowable claim 1, and accordingly are allowable for at least the reasons set forth above. Claims 5-6, 13,14,16-19, 20-21 may be additionally patentable for reasons not discussed herein.

Independent Claim 50

Claim 50 recites a method for growing an immature embryogenic culture of *Pinus taeda* somatic embryos or hybrids thereof on a nutrient medium comprising lactose, selected from induction medium, maintenance medium and prematuration medium.

Pullman, Handley and Find

The deficiencies of Pullman and Handley with respect to claim 50 have been argued above, in the prior appeal brief, and in prior responses. These arguments are incorporated herein by reference, *mutatis mutandis*. Neither Pullman nor Handley teach or suggest the use of lactose and an additional sugar in an induction, maintenance or prematuration medium in a method for growing an immature embryogenic culture according to claim 50.

The Examiner combines Pullman and Handley with Find, but the Office action fails to indicate how Find cures the deficiencies of Pullman and Handley set forth above. As noted above for claim 1, Find teaches use of lactose in the maturation step of conifer somatic embryogenesis, not in induction, maintenance or prematuration of immature embryonic cultures. As detailed in the declarations of Attree and Fowke (submitted with the Response filed May 16, 2008), those skilled in the art would expect the media used during different phases of growth to be different. See Fowke Declaration at 9 and Attree Declaration at 8. During induction, maintenance and prematuration the somatic embryos need to be induced, grow and be maintained in an immature state. Maturation requires the somatic embryos to stop proliferating and to differentiate into mature embryos. Thus, Find's teaching of the use of lactose in

maturation media would not combine with Pullman and Handley to teach the elements of the claim because Pullman and Handley do not teach use of lactose in induction, maintenance or prematuration media, and those skilled in the art understand the very different media requirements for the maturation step as opposed to the induction, maintenance and prematuration steps of somatic embryogenesis.

Pullman and Schuller

The deficiencies of Pullman with respect to claim 50 have been argued above, in the prior appeal brief, and in prior responses. These arguments are incorporated herein by reference, *mutatis mutandis*.

Pullman and Schuller fail to teach or suggest the method of claim 50 for at least the reasons set forth above for claim 1, which arguments are incorporated herein by reference, *mutatis mutandis*.

For at least these reasons, the Office action fails to establish a *prima facie* case of obviousness for claim 50.

Claims 52-54

Claims 52-54 each depend from allowable claim 50, and accordingly are allowable for at least the reasons set forth above. Claims 52-54 may be additionally patentable for reasons not discussed herein.

Independent Claim 55

Claim 55 recites a method for growing an immature embryogenic culture selected from *Pinus radiata* or hybrids thereof and *Pseudotsuga menziesii* or hybrids thereof on a nutrient medium which comprises maintenance medium or prematuration medium and includes a galactose-containing sugar and an additional sugar, and which includes the step of growing and maintaining the embryogenic culture, or the step of transferring the embryogenic culture from the prematuration medium to a maturation medium not containing auxin or cytokinin for subsequent development of mature embryos capable of germination.

Pullman, Handley and Find

The deficiencies of Pullman and Handley with respect to claim 55 have been argued above, in the prior appeal brief, and in prior responses. These arguments are incorporated herein by reference, *mutatis mutandis*. Neither Pullman nor Handley teach or suggest the use of a galactose-containing sugar and an additional sugar in a maintenance or prematuration medium in a method for growing an immature embryogenic culture according to claim 55.

The Examiner combines Pullman and Handley with Find, but the Office action fails to indicate how Find cures the deficiencies of Pullman and Handley set forth above. As noted

above for claims 1 and 50, Find teaches use of lactose in the maturation step of conifer somatic embryogenesis, not in induction, maintenance or prematuration of immature embryonic cultures. As detailed in the declarations of Attree and Fowke (submitted with the Response filed May 16, 2008), those skilled in the art would expect the media used during different phases of growth to be different. See Fowke Declaration at 9 and Attree Declaration at 8. During induction, maintenance and prematuration the somatic embryos need to be induced, grow and be maintained in an immature state. Maturation requires the somatic embryos to stop proliferating and to differentiate into mature embryos. Thus, Find's teaching of the use of lactose in maturation media would not combine with Pullman and Handley to teach the elements of the claim because Pullman and Handley do not teach use of lactose in induction, maintenance or prematuration media, and those skilled in the art understand the very different media requirements for the maturation step as opposed to the induction, maintenance and prematuration steps of somatic embryogenesis.

Pullman and Schuller

The deficiencies of Pullman with respect to claim 55 have been argued above, in the prior appeal brief, and in prior responses. These arguments are incorporated herein by reference, *mutatis mutandis*.

Pullman does not teach or suggest media for use in maintenance or prematuration and is limited to media for improving initiation (induction). Schuller teaches a nutrient medium for use in *Abies alba*. As noted in the specification at page 7, lines 12-15, *Abies alba* has distinct growth requirements from other conifers. Schuller also notes that *Abies* somatic embryogenesis is distinct from that of other conifers including *Pinus*. See Schuller at page 23, Introduction (“[s]omatic embryogenesis in *Abies alba*... is different from that in other conifers since the induction and proliferation of ESM could be achieved on media supplemented with cytokinin only. With sucrose, a carbohydrate source which is widely used for propagation of other conifers, no maturation of SE was observed in *Abies alba*.”). One skilled in the art would not look to *Abies alba* somatic embryogenesis for direction somatic embryogenesis of *Pinus radiata* or *Pseudotsuga menziesii*. In addition, the results of Schuller demonstrate that in most cases no late cotyledonary stage embryos were obtained and Schuller is silent as to whether any of the embryos were capable of germination as recited in claim 55.

Accordingly, the Office action fails to establish a *prima facie* case of obviousness for claim 55.

Claim 43 is Free of Prior Art

Applicants thank the Examiner for her indication that claim 43 is free of the prior art. Applicants respectfully submit that the remarks and amendments made herein address the rejection of claim 43 under 35 U.S.C § 112, second paragraph, such that claim 43 is allowable.

CONCLUSION

For at least the reasons discussed above, Applicants respectfully assert that the claims of the present application are in condition for allowance. Applicants respectfully request that the Examiner withdraw the rejections and issue a timely Notice of Allowance. Should the Examiner find that the application is not allowable, applicants respectfully request that the Examiner telephone the undersigned at the number below to set up an interview.

Respectfully submitted,

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